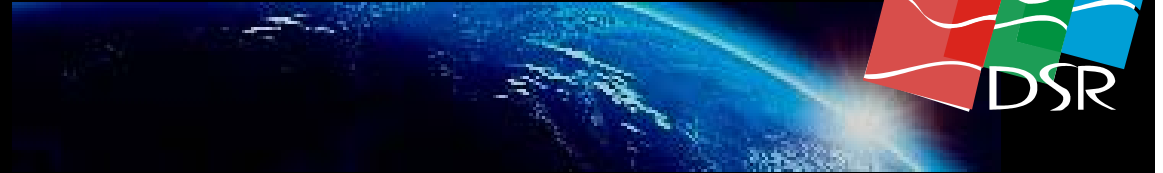
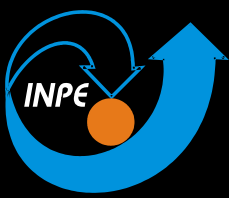


Comparisons between Eulerian and Lagrangian measurements in the SW South Atlantic.

Arcilan T. Assireu & João A. Lorenzzetti
Division of Remote Sensing
National Space Research Institute



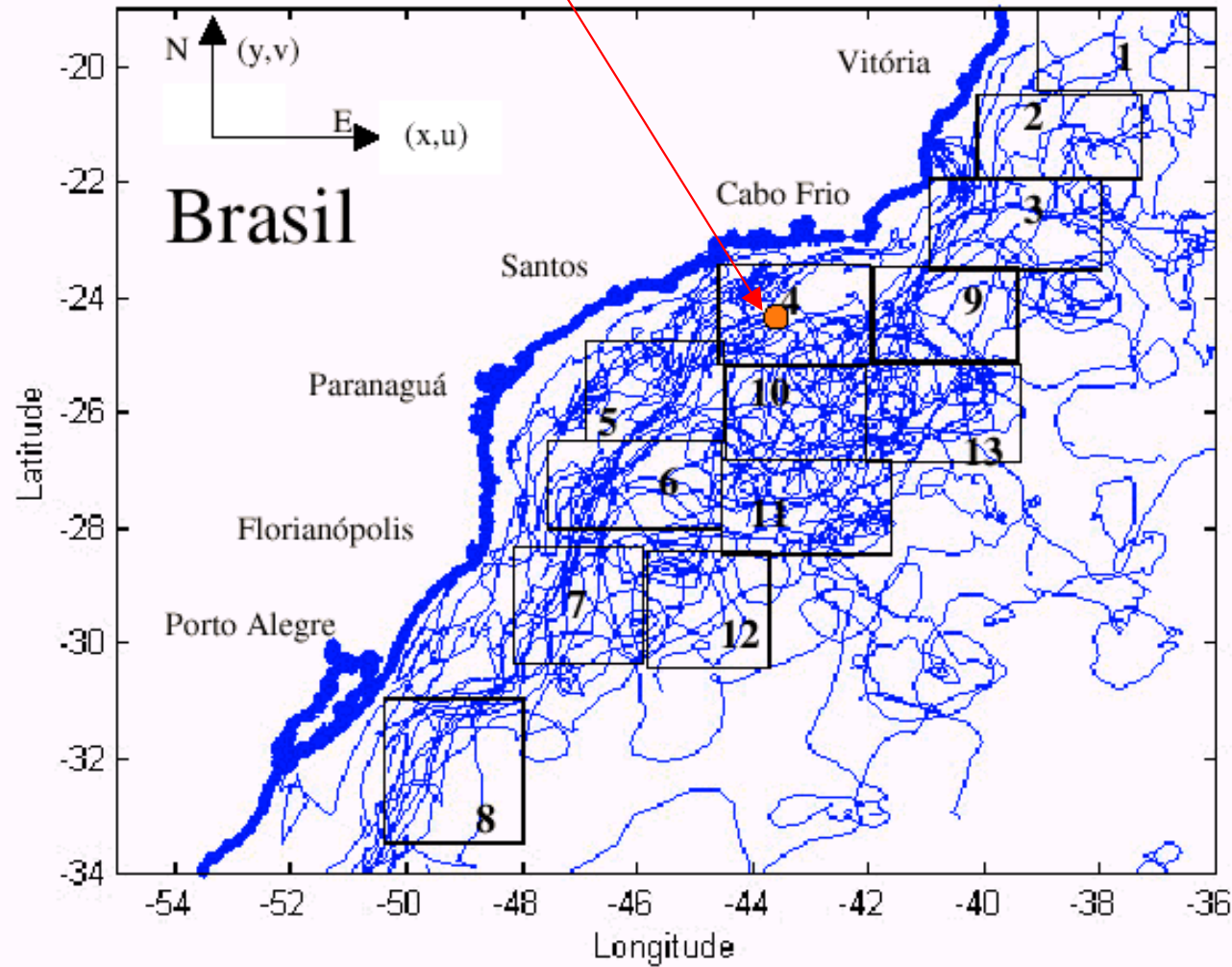
OBJECTIVE OF THE STUDY

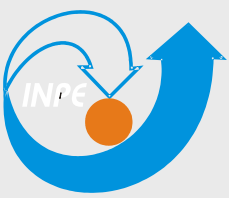
- To verify the possibility of integrating Eulerian (current meter mooring) and Lagrangian (drifter) data for SW South Atlantic

MOTIVATION

- To test the coherency between these data sets

AREA OF STUDY





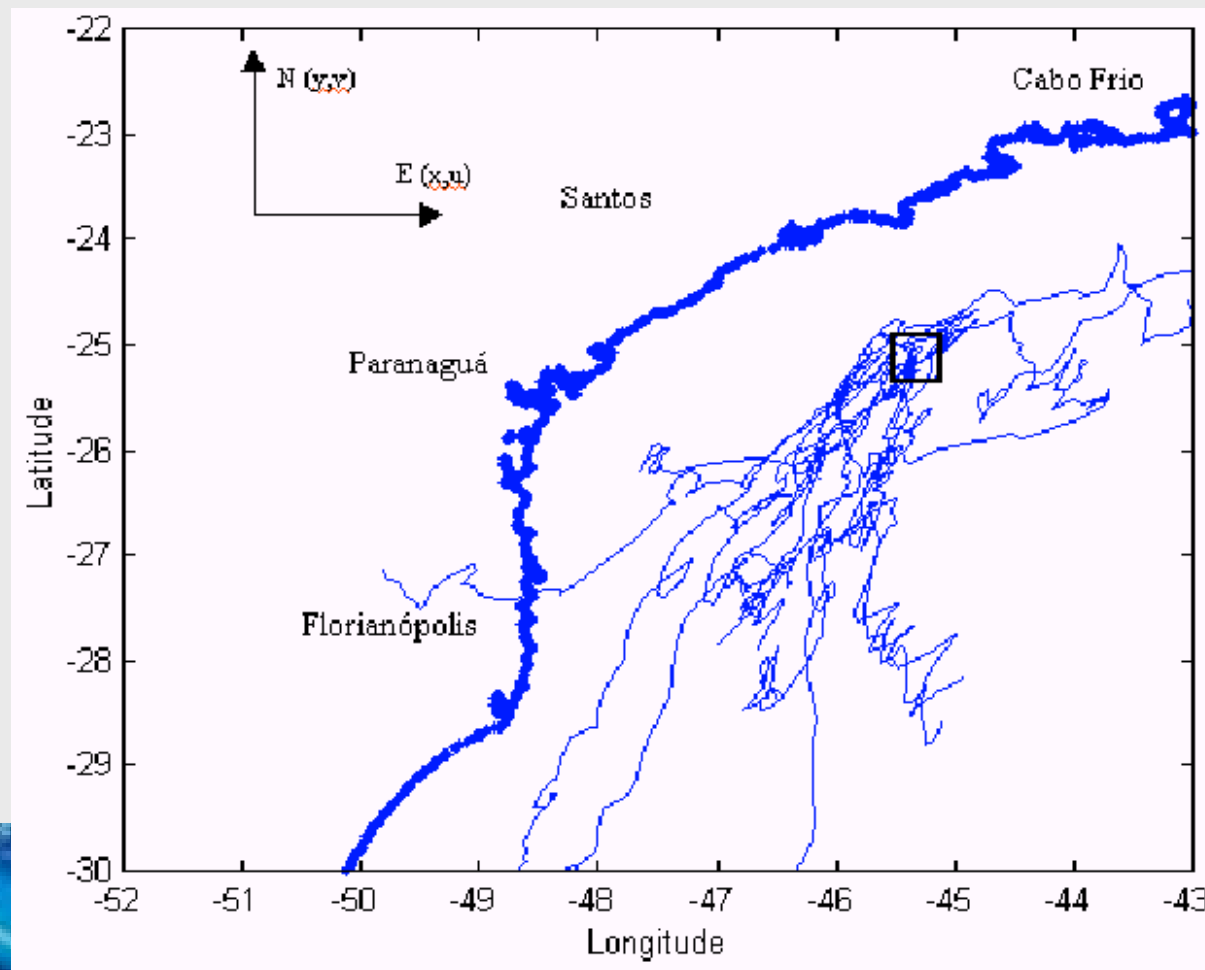
METHODS

- **Progressive vector diagrams (for mooring data)**
- **Maximum Entropy Spectrum**
- **Assimetric Fragmentation (FA) operator**

METHODS

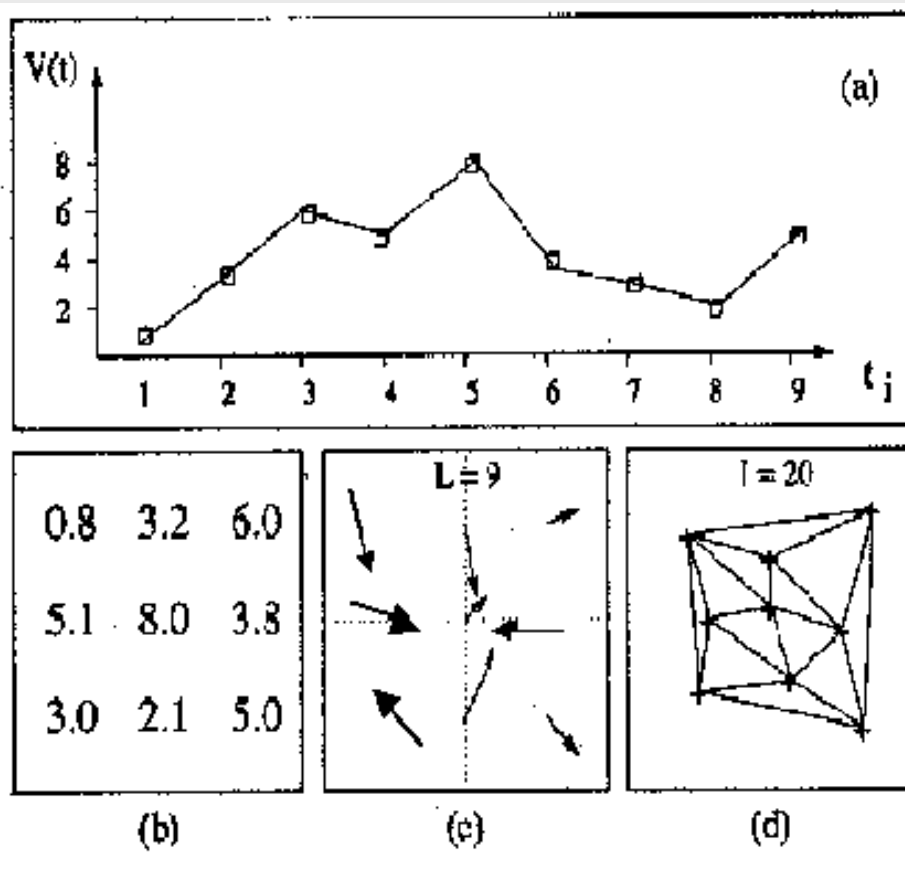
- **Progressive vector diagrams (for mooring data)**

$$(x,y) = (x_0,y_0) + \sum (u_i,v_i) \Delta t_i, (i=1,2,...)$$



METHODS

- Assimetric Fragmentation Operator (FA)



$$FA = (I - L) / L$$

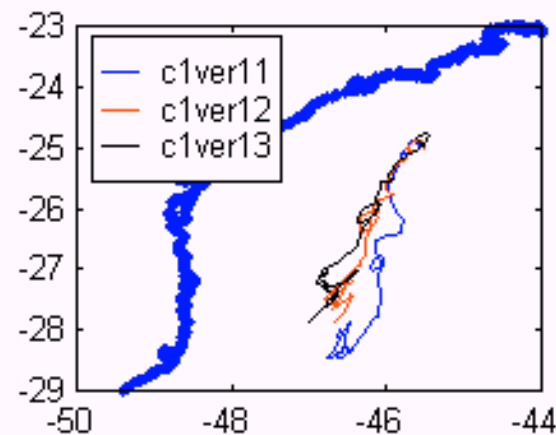
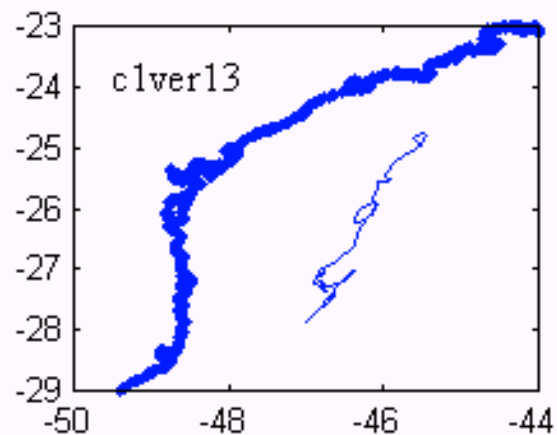
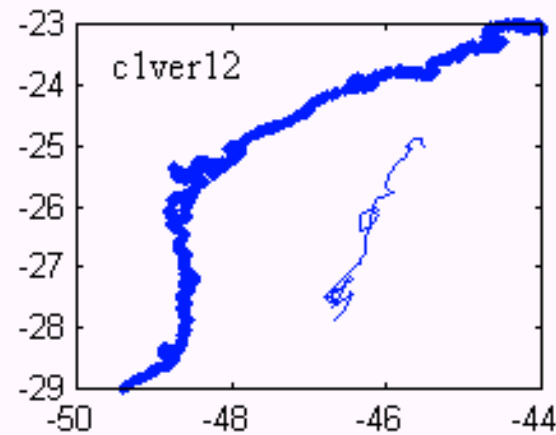
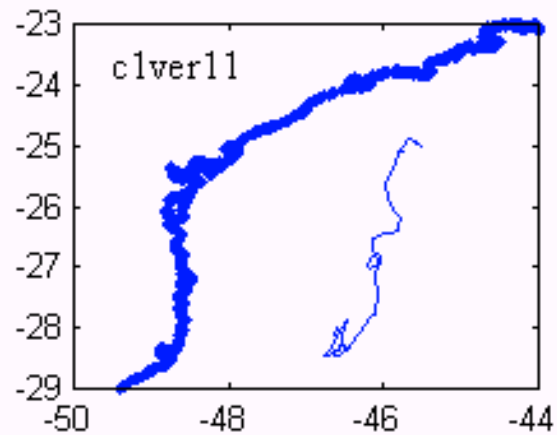
I = n. lines of Delaunay triangulation

L = n. of assimetric vectors

$FA = 1.222$ in the example

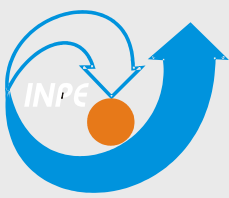
RESULTS

5.3.1 – Fundeios relativos ao verão de 1993.



Current meter

Mooring –
Summer of
1993



RESULTS

Current Meter	Observation Period	No. Days	Mean Velocity (cm/s)	Mean Direction (degrees from N)	Mean Temp. (C)
Sum01(30m)	01/01/93 - 10/03/93	70	15.3	190	19.9
Sum02(58m)	01/01/93 - 10/03/93	70	14.9	189	17
Sum03(91m)	01/01/93 - 10/03/93	70	14.8	160	15.8
	Mean		15.0 (17.0)	179 (219)	17.5 (25.1)
	Standard Dev.		0.3 (1.4)	17 (5)	2.0 (0.5)
Current Meter	Observation Period	No. Days	MKE cm ² /s ²	EKE cm ² /s ²	EKE/TKE (%)
Sum01(30m)	01/01/93 - 10/03/93	70	117	102	46
Sum02(58m)	01/01/93 - 10/03/93	70	111	99	48
Sum03(91m)	01/01/93 - 10/03/93	70	109	100	47
	Mean		112 (146)	102 (340)	47 (69)
	Standard Dev.		4 (25)	1 (111)	1 (10)
MKE = Mean Kinetic Energy					
EKE = Eddy Kinetic Energy					
TKE = Total Kinetic Energy					

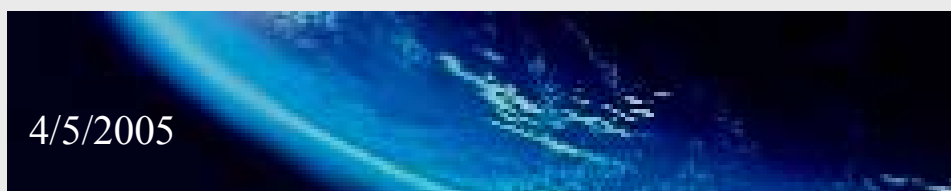
4/5/2005

Summer 1993

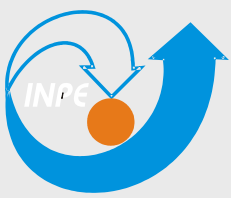
RESULTS

Correntógrafo	Período de observação		Duração em dias	Velocidade média (cms^{-1})	Direção média (graus)	Temperatura média ($^{\circ}\text{C}$)
Clinv11	11/07/93	21/09/93	71	18,1	166	20,1
Clinv12	11/07/93	21/09/93	71	18,6	170	19,9
Clinv13	11/07/93	21/09/93	71	19,9	177	17,8
Valores médios				18,8 (10,0)	171 (230)	19,2 (21,0)
Desvio padrão				0,9 (1,0)	5,6 (24,0)	1,2 (0,7)

Correntógrafo	ECM (cm^2/s^2)	ECV (cm^2/s^2)	ECV/ECT (%)
Clinv11	163	167	50
Clinv12	173	163	48
Clinv13	198	186	48
Valores médios	178 (52)	172 (414)	48 (88)
Desvio padrão	17 (11)	12 (147)	1 (7)



Winter 1993



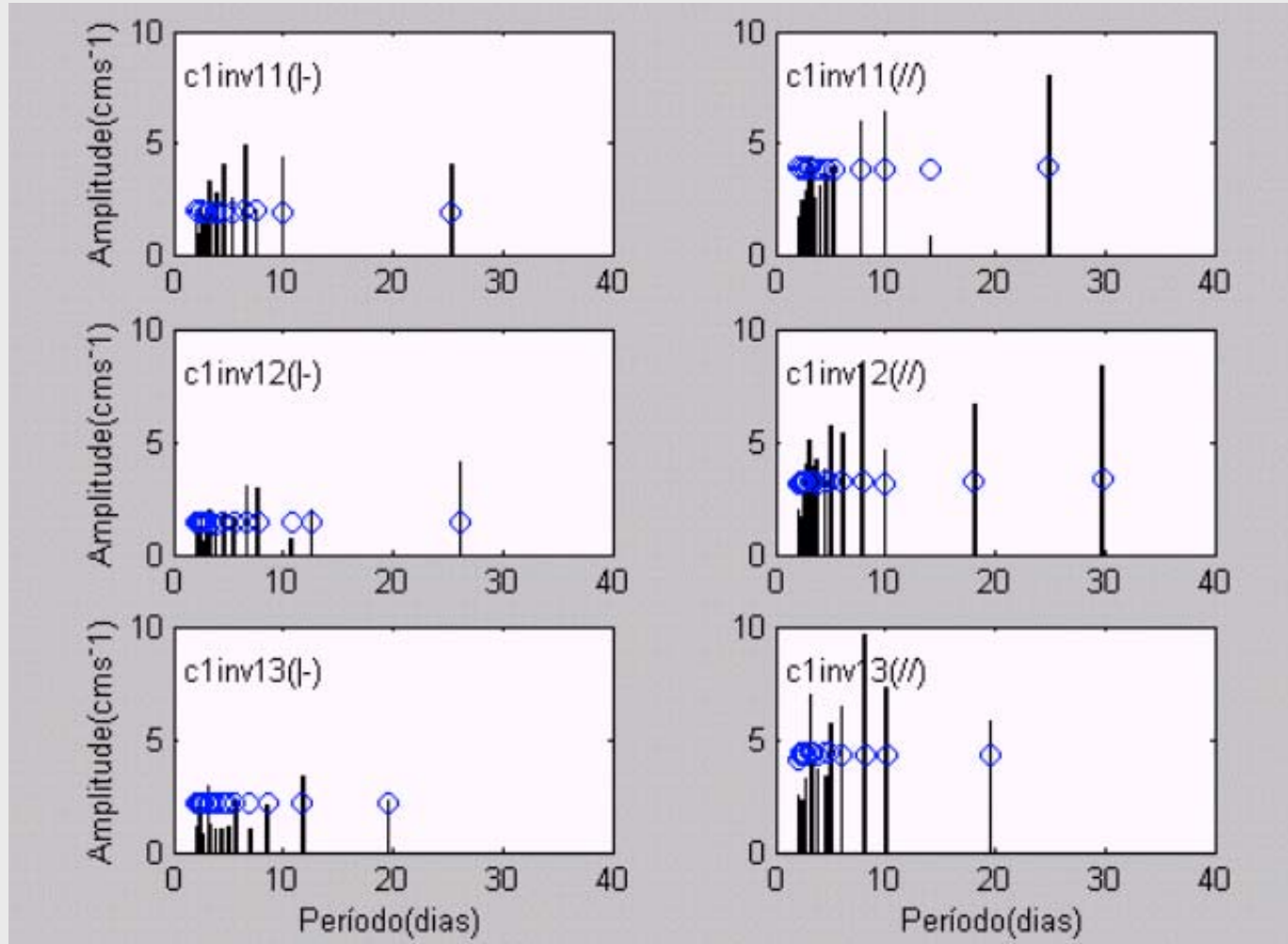
RESULTS

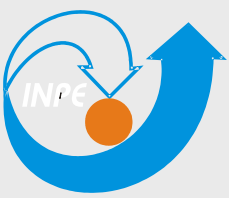
Seasonal Variability in the Current Meter Data

Season	Mean Speed (cm/s)	Mean Direction (deg.from N)	Mean Temp. (C)	MKE (cm ² /s ²)	EKE (cm ² /s ²)
Summer 93	15	179	17.5	112	102
Autumn 93	18	159	19.9	165	161
Winter 93	18.8	171	19.2	178	172
Spring 93	19.5	189	17	190	124
Summer 94	15.5	200	17.8	120	103

RESULTS

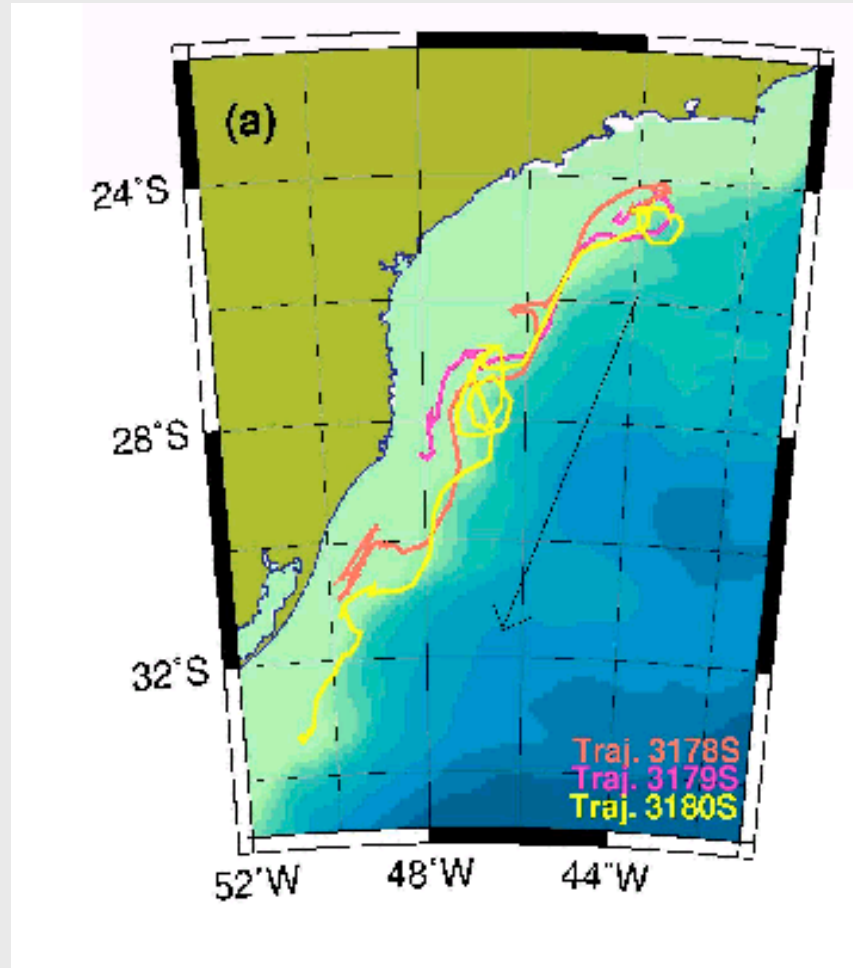
Current Meter – Spectral Analysis





RESULTS

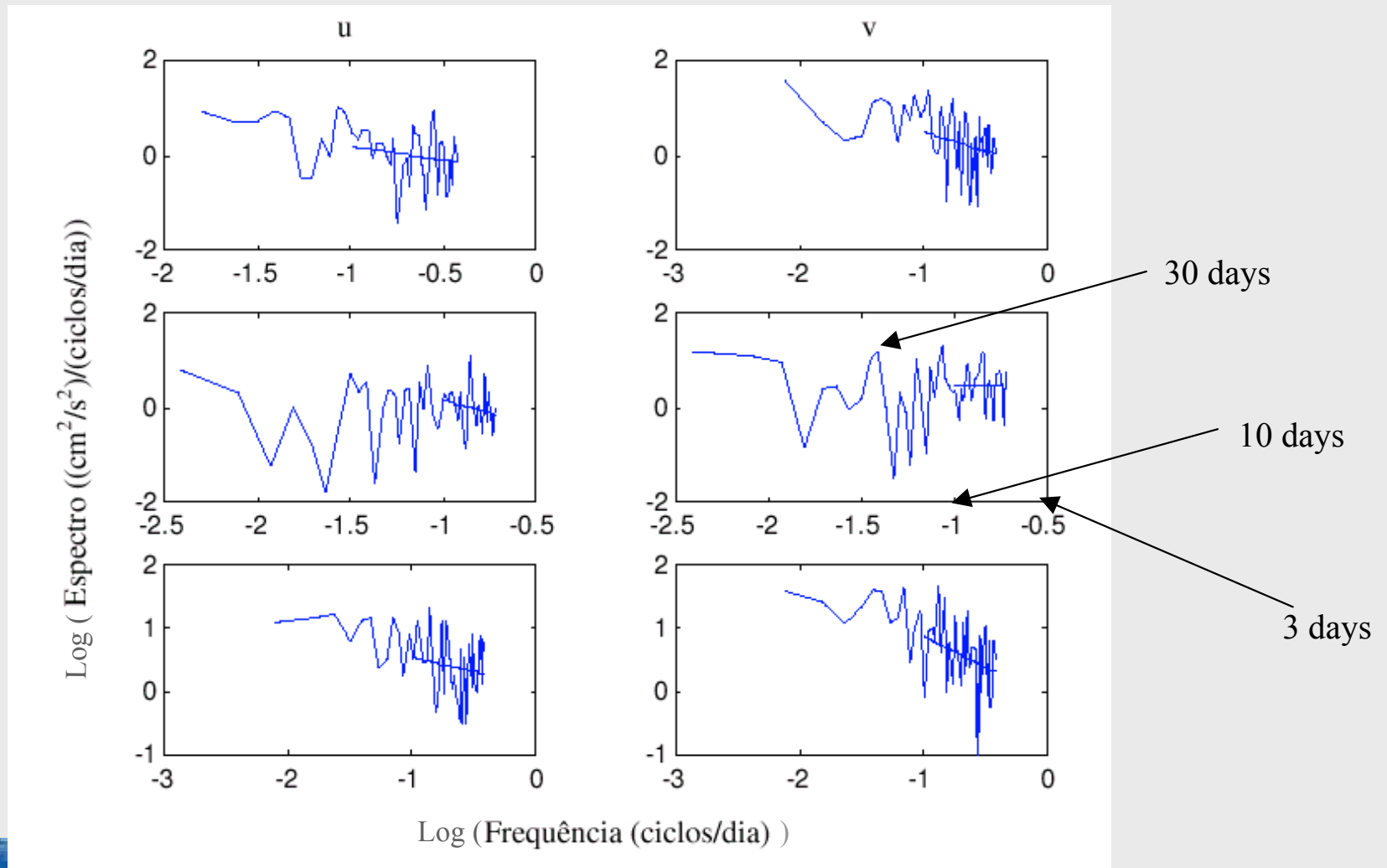
Drifter – Spectral Analysis

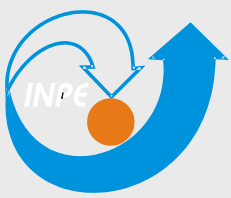


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RESULTS

Drifter – Spectral Analysis

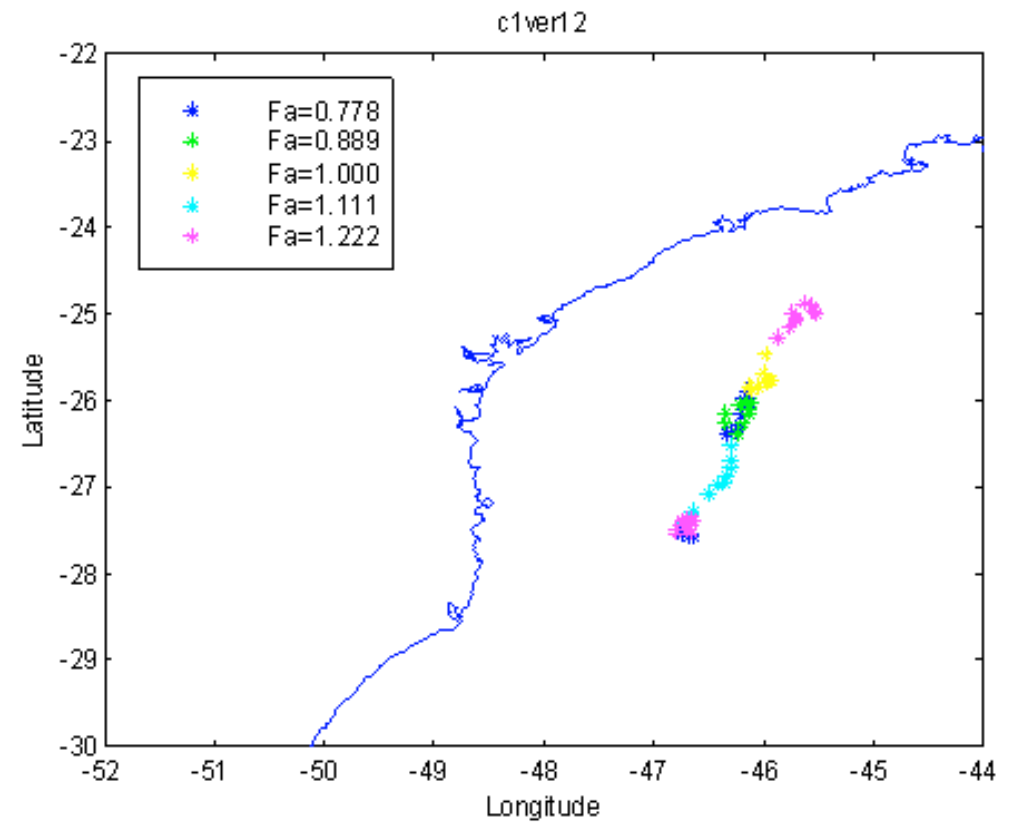
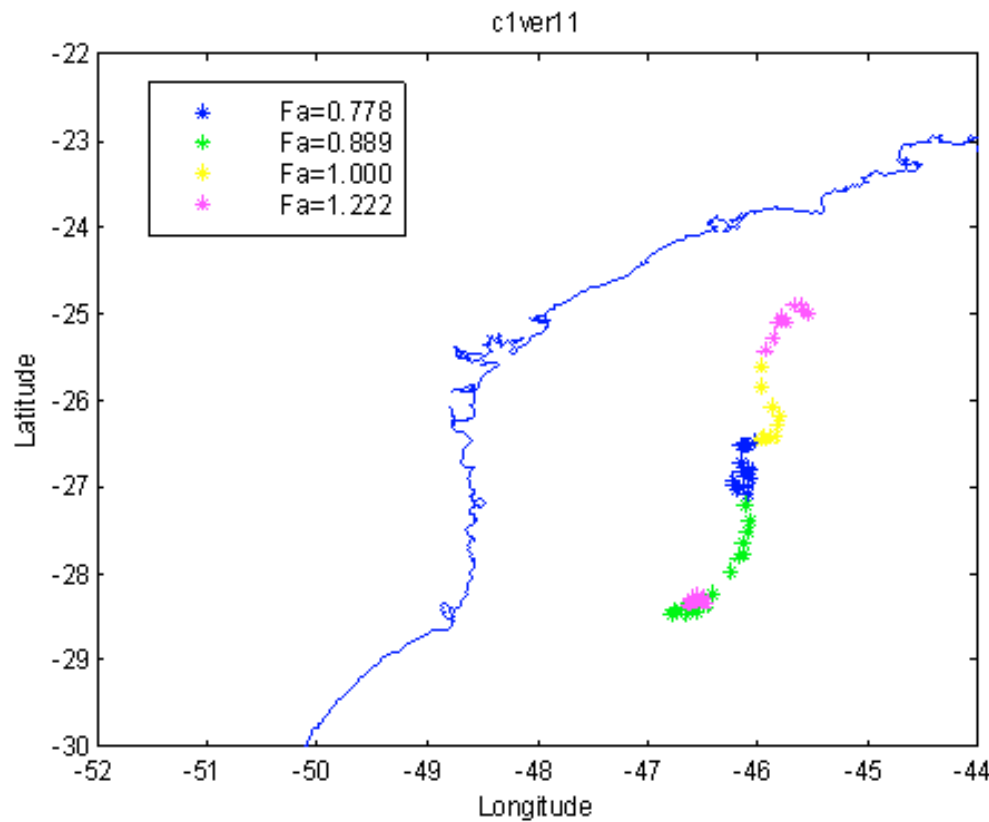




RESULTS



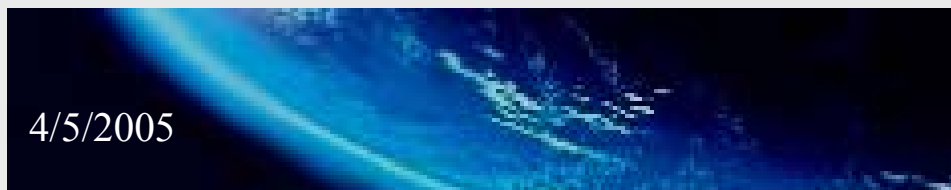
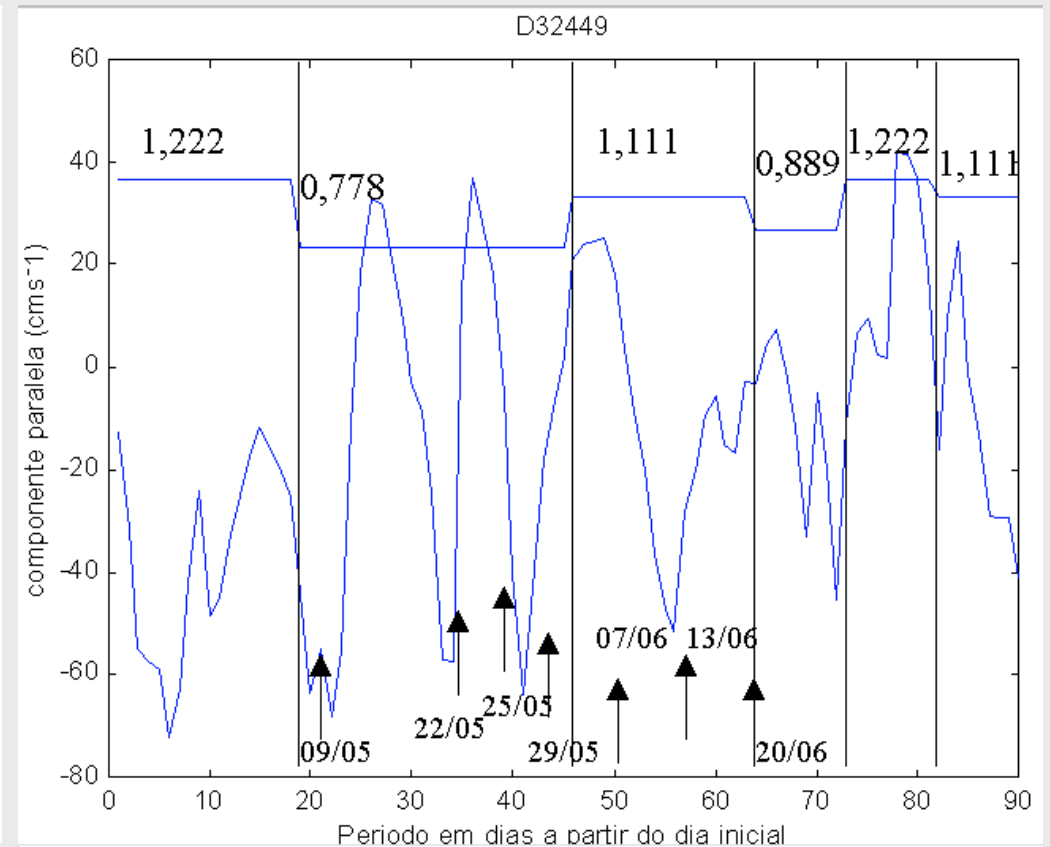
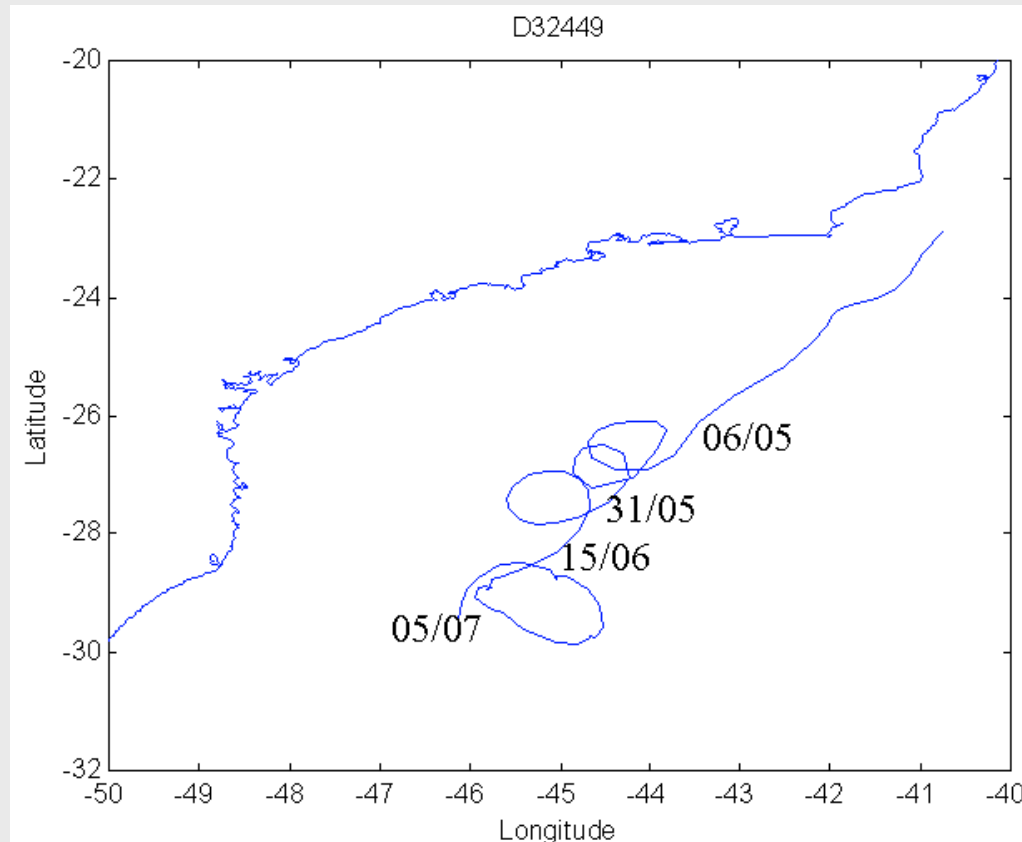
Local FA (PVD for current meter data)

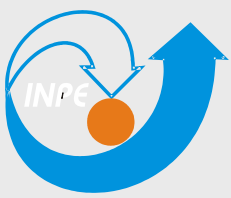


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Local FA (drifter trajectory time series - 1997)





RESULTS

Current Meter x Drifter parameters

Area	Period (days)	<u> cm/s	D<u> cm/s	<v> cm/s	D<v> cm/s	u' cm/s	D(u') cm/s	v' cm/s	D(v') cm/s	u EKE cm^2/s^2	vEKE cm^2/s^2
4	289	-9.9	4.9	-8.5	4	22.9	3.4	23.4	2.9	262.6	273.4
CM	375	-2.2	2	-6.6	2	8.7	1.5	12.5	1.4	55	93

$$V_i(t|x) = U_i[R(t|x)] + \frac{\partial k_{ij}(x,t)}{\partial x_j}$$

$$\frac{\langle v_i'(t|x) \rangle}{\langle V_i(t|x) \rangle} \ll 1$$



Região	u'	v'	Tx	Ty	Lx	Ly	KxX10 ⁷	KyX10 ⁷	θ (Eixo principal de variância)
	cm/s	cm/s	dias	dias	km	km	cm ² /s	cm ² /s	
1	8,6	8,4	4,9	4,0	42,0	33,3	3,1	2,4	-32
2	21,1	28,2	1,9	0,9	40,8	25,3	7,4	6,2	33
3	17,6	27,4	2,3	0,9	41,1	25,6	6,2	6,1	21
4	22,9	23,4	1,8	1,2	40,6	27,2	8,0	5,5	42
5	21,6	28,5	1,9	0,9	40,7	25,2	7,6	6,2	33
6	19,2	31,9	2,1	0,7	41,0	23,8	6,8	6,6	18
7	22,7	28,5	1,8	0,9	40,6	25,2	8,0	6,2	39
8	16,0	29,1	2,6	0,9	41,3	25,0	5,7	6,3	35
9	20,8	24,2	2,0	1,1	40,8	26,9	7,3	5,6	39
10	21,4	22,6	1,9	1,2	40,8	27,6	7,5	5,4	-35
11	26,2	28,2	1,5	0,9	40,3	25,3	9,1	6,2	-10
12	20,0	24,7	2,0	1,1	40,9	26,7	7,1	5,7	45
13	17,0	17,4	2,4	1,7	41,2	29,6	6,0	4,5	41